

SAMVARDHINI: - 20/12/2023  
Volume - 5  
Issue - 2  
(ISSN ONLINE: - 2583-7176)  
<https://samvardhini.in>



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## Vaiśeṣika Darśana as an ancient source of Physical Properties of the substances

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### Abstract

We can find many scientific terms in ancient Indian Literature, and Darśanas are mainly among them. Six Darśanas are famous for their philosophy. From these Darśanas, the Vaiśeṣika Darśana is mainly related to physics. The philosophy in this Darśana is very much similar to modern scientific concepts. Six padārthas (Dravya, Guṇa, Karma, Sāmānya, Viśeṣa, and Samvāya) are used in Vaiśeṣika Darśana to classify all known objects. Among those is the Guṇa, which is divided into three categories: solids, liquids, and gases, which are comparable to the physical properties in use today.

The current paper aims to establish a correlation between the notions of liquid and liquidity found in select texts from the Vaiśeṣika Darśana tradition and those notions recognised by contemporary science.

## INTRODUCTION:

India is peculiarly rich in philosophical speculations. Six well-known schools of Indian philosophy are Nyāya, Vaiśeṣika, Sāṃkhya, Yoga, Pūrva Mimāṃsā and Uttara Mimāṃsā or Vedānta. According to Indian tradition, the Vaiśeṣikasūtra is ascribed to Kaṇāda. The name Vaiśeṣika is due to the atomic theory based mainly on the category of viśeṣa (particularity) conceived first by Kaṇāda. His atoms are 'mathematical points', without parts and possessing the same attribute and activity in their respective classes of 'Earth', 'Water', 'Fire', and 'Air'. It is using their 'viśeṣas' or individual characteristics that they are distinguished from one another (Basu 1923:2). There are many commentaries based on this Sūtra.

From Vaiśeṣika school literature, only three namely Vaiśeṣikasūtra, Padārdha-dharma-saṃgraha and Saptapadārthī are considered for this paper. Padārdha-dharma-saṃgraha or Praśastapāda-bhāṣya is a commentary written by Praśastapādācārya. The author of Saptapadārthī is Śivāditya. The Vaiśeṣika system is not only a science of proof but it is a science of techniques too. It is mainly related to the knowledge of padārthas. A right knowledge of the padārthas may be the result of either of pratyakṣa (direct perception) or of anumāna (inference). This paper aims to correlate the term 'Liquid and its properties', discussed in Vaiśeṣika Darśana and in modern science. According to the Vaiśeṣika system, all known things in this world are divided into six padārthas. The padārtha means object of knowledge or 'category'. That means every object of knowledge must have some name and is categorized by padārtha. As explained by Mohan (1934:I) the six padārthas are - dravya (substance), guṇa (attribute), karma (action), sāmānya (generality), viśeṣa (particularity) and samavāya (inherence). Only Saptapadārthī has added one more category abhāva (non-existence).

In this paper 'liquid' the physical property of substance and its some aspects are discussed in correlation with the modern science.

### Liquid:

Dravya (substance) - There are nine types of substances. Apa i.e. water (liquid) is one of those substances.

Here are some specifications mentioned about the liquid in the Vaiśeṣikasūtra.

Apa (water) –

रूपरसस्पर्शवत्य आपो द्रवाः स्निग्धाः । ..... (Vaiśeṣikasūtra 2.1.2)

Meaning - Water possesses colour, taste, and touch and they are fluid and viscous. In the Vaiśeṣika system water is considered of two kinds - eternal and non-eternal. It is eternal in the form of atoms and non-eternal as products. The special quality of water is taste. Water has fourteen qualities - colour, taste, touch, number, dimension, distinctness, conjunction, disjunction, distance, proximity, gravity, viscosity, fluidity and faculty (Bose 1971:459).

### Fluidity:

*Guṇa* (attributes) - In the Vaiśeṣika system there are 24 types of *Guṇas* described. These *Guṇas* are very similar to the Physical Properties of matter in modern science. *Dravatva* (fluidity) is one of those properties. Fluidity is considered as the quality of water.

द्रवत्वात् स्यन्दनम् । ..... (Vaiśeṣikasūtra 5.2.5)

Meaning - Running due to fluidity.

It's clearly mentioned in Vaiśeṣika Sūtra that liquid flows due to its *Dravatva guṇa*, and the definition of fluidity in modern science is, that the physical property of a substance that enables it to flow is fluidity. Here we can see the similarity in definitions of fluidity in the Vaiśeṣikasūtra and modern science.

The Padārtha-dharma-saṃgraha also states –

द्रवत्वं स्यन्दनकर्मकारणम् । .... (*dravatva nirupaṇa prakaraṇa, Padārthadharmasamgraha*)

that means action of flow is due to *dravatva*.

In the Padārtha-dharma-saṃgraha and the Saptapadārthī two types of *dravatva* are mentioned.

तत्तु द्विविधम् सांसिद्धिकं नैमित्तिकं च । सांसिद्धिकमपां विशेषगुणः । नैमित्तिकं पृथिवीतेजसोः सामान्यगुणः ।  
.....(*dravatva nirupaṇa prakaraṇa, Padārthadharmasamgraha*)

द्रवत्वं सांसिद्धिकं नैमित्तिकं च । ..... (*Saptapadārthī, 34*)

सांसिद्धिकत्वं तेजःसंयोगात्प्राद्यत्वम् । तेजःसंयोगात्प्राद्यत्वं नैमित्तिकत्वम् । ..... (*Saptapadārthī, 142*)

*Dravatva* is the cause of the action of flowing in the same way. Fluidity is of two types – *sāmsiddhika* (natural) and *naimittika* (incidental). Natural fluidity is the specific property of water. Incidental fluidity is due to a substance like fire which results in fluidity to that substance. e.g. melted butter or melted gold. Originally these substances are in solid form but due to the contact of heat, they result in liquid. We can't find such type classification of liquid in modern science.

### Principle of Hand Pump:

अपां संयोगाभावे गुरुत्वात् पतनम् । .... (Vaiśeṣikasūtra 5.2.3)

Meaning - In absence of any force water falls down due to gravity. Gravity is also described in detail in Vaiśeṣika system, but in this paper this topic is not covered as main focus of this paper is on liquid and its properties.

Vaiśeṣika knows that, water falls due to gravity, to lift it upwards special force is required.

नाड्या वायुसंयोगादारोहणम् । ....(Vaiśeṣikasūtra 5.2.6)

नोदनात् पीडनात् संयुक्तसंयोगाच्च । ....(Vaiśeṣikasūtra 5.2.7)

Meaning - rising upward due to its conjoining with air and tubes, and through a squeezing pressure.

*Nāḍi* - tube

*Nodana* - anti gravitational force

*Piḍana* - pressure

Here we can see that, how to uplift water anti gravitationally, is clearly mentioned, using air pressure and a tube. So, one can state that Vaiśeṣikas knows the technique of uplifting water. But no such archaeological evidence is still found.

In today's water pump, the same technique is used to lift the water in an upward direction. The principle of pressure theory to operate a water pump has been used since ancient times. The hand pump is used for bringing out water from the soil. There are two plungers, one is on the top and another is at the bottom, which is sealed by a valve. With the pressure, a top plunger will rise above and pull water, at the same time bottom plunger which is sealed tight with a valve, will stop the water by going back to the well.

## Capillary Action:

वृक्षाभिसर्पणमित्यदृष्टकारितम् । ....(Vaiśeṣikasūtra 5.2.7)

For trees to pull water from roots to the branches no outer force is used, but the force used is *adr̥ṣṭa* and not visually seen. In modern science, this process is known as capillary action.

Capillary action in modern science is described as follows –

Capillary action: Plants put down roots into the soil which are capable of carrying water from the soil up into the plant. Water, which contains dissolved nutrients, gets inside the roots and starts climbing up the plant tissue.

## Effect of Heat on Water :

Due to the heat solid melts in liquid form is mentioned in Vaiśeṣikasūtra.

अपां संघातो विलयनं तेजःसंयोगात् । ....(Vaiśeṣikasūtra 5.2.8)

Meaning - For water, due to its conjoining with fire, there is coalescence and dissolution. Modern science also states that solid form of water i.e. ice melts when it comes into contact with heat.

## CONCLUSION:

The scope of this paper is limited to the term 'liquid and its properties' from the Vaiśeṣika system. From this work, we can clearly say that the principles about the physical properties of liquid which are explained in modern Physics are very well described in Vaiśeṣika system in 6th c. BCE. (Bose 1971: 452) and this tradition continued till Tarkasaṃgraha (17th c.CE). After this study, we can state that these types of literature are the scientific literature of that time.

Using visionary thoughts and meticulous experimentation, Vaiśeṣikas explain the basic principles of science which are evident in literature, but any archaeological evidence of their practical work is not available to date. The continuity of this Indian Knowledge Systems should be studied and preserved by new generation.

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